

10 Group 2 – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)
Thermal decomposition	_____
hydroxides	_____
sulfates	_____

Recall

From Part 1 you know the Group 2 metals. Here we heat their **compounds** and look at how easily they break apart and dissolve.

- **Thermal decomposition** means breaking a compound by heating.
- The trends down the group are clear and worth learning.

New ideas

Read these first, then do the Practice.

■ 1 Thermal decomposition

Heating breaks the compounds apart:

- **carbonates** → oxide + carbon dioxide: $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$.
- **nitrates** → oxide + brown NO_2 + oxygen.

■ 2 Thermal stability increases down the group

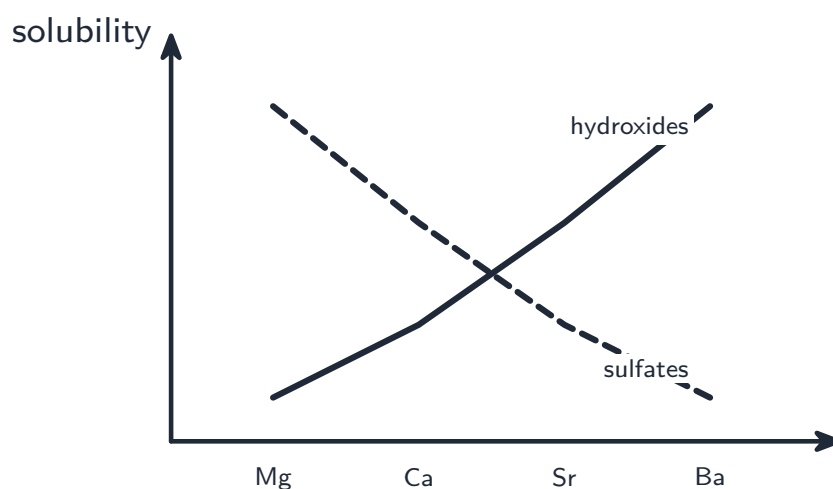
A **larger** metal ion pulls **less** on the carbonate (or nitrate) ion, so it **distorts** it less and the compound is **harder** to break apart. So magnesium carbonate decomposes most easily, and barium carbonate is the hardest.



■ 3 Solubility trends

Compound	Down the group
hydroxides	become more soluble
sulfates	become less soluble

(So $\text{Mg}(\text{OH})_2$ is nearly insoluble but $\text{Ba}(\text{OH})_2$ dissolves; MgSO_4 dissolves but BaSO_4 is insoluble.)



Watch out: thermal stability *increases* down the group – a *larger* cation distorts the anion *less*, so the carbonate is harder to break apart. The two solubility trends go opposite ways: hydroxides become more soluble, sulfates less soluble.

Practice

Try these in order.

10.1 What is meant by *thermal decomposition*?

[1]

10.2 Write the equation for the thermal decomposition of calcium carbonate. [2]

10.3 State and explain the trend in thermal stability of the carbonates down Group 2. [3]

10.4 State the trend down the group in the solubility of (a) the hydroxides, (b) the sulfates. [2]

10.5 Which is more soluble, magnesium hydroxide or barium hydroxide? [1]

10.6 Challenge. Predict which decomposes at a *lower* temperature – magnesium carbonate or barium carbonate – and explain. [2]
